SUPPLIER OF SOLAR-POWERED AND MAINS-POWERED, RO AND DESALINATION, WATER PURIFICATION SYSTEMS
Services WaterCap offers:

- Design of water treatment systems utilising state of the art 3D software tools.
- Vertically Integrated manufacturing
- Minimised lead times
- Products tested QA/QC
- Specialised Installation Team of technicians led by leading certified water engineers to ensure the timely installation and commissioning of water treatment systems supplied.

The above services allow for operational strengths and long-term operation of the equipment at the required performance levels.

Mains Powered Water Purification Systems

**PRE-TREATMENT**

**REVERSE OSMOSIS (RO) (SWRO)**

**POST TREATMENT**

- Pre-engineered, Pre-assembled, Reverse Osmosis Water Treatment Unit in a 20’ / 40’ steel shipping container.
- Our containers are ergonomically designed, temperature-regulated with a coated floor.
- State-of-the-art automation executed Programmable Logic Controller (PLC)

- Data feed direct from the plant to engineering HQ and immediate online support.
- European standards of design combined with branded equipment such as Danfoss / Xylem / Lowara and Hydranautics Reverse Osmosis membrane elements.
- Wetted parts of all pumps included are Duplex stainless steel for high pressure and AISI 316/316L stainless steel for low pressure to ensure high resistance to corrosion.
- Estimated HPP power consumption up to 5kWh/m³
- WTP system has been designed and engineered to cope with raw water salinity up to TDS: 40,000ppm

WaterCap has the engineering capability to design, build and install models ranging from 1m³ - 120m³ per hour on demand containerised mobile water treatment solutions. Bespoke projects of both mobile and fixed water solutions exceeding 120m³ per hour can be scoped and supported on a project by project basis.

Vertically Integrated manufacturing

Minimised lead times

Products tested QA/QC

Experienced technicians with proven track records in supporting water treatment operations in complex environments.

Service support and logistical supplies globally
System Requirements

RAW WATER ANALYSIS
A complete Physiochemical analysis of the Raw Water is needed prior to final detailed engineering of the system.

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>6.95</td>
</tr>
<tr>
<td>Ca</td>
<td>1.499 ppm</td>
</tr>
<tr>
<td>Mg</td>
<td>450 ppm</td>
</tr>
<tr>
<td>NO₃</td>
<td>1 ppm</td>
</tr>
<tr>
<td>SO₄</td>
<td>250 ppm</td>
</tr>
</tbody>
</table>

ASSUMPTIONS
- Raw Water Boron < 5 ppm
- Chlorides > 24000 pp
- Raw water does not contain colloidal turbot, colloidal Silica, Colloidal Iron or any other pollutant not stated in the chemical analysis.
- No other pollutants that would potentially harm the membranes are present to the water to be treated.
- There is no organic load present in the raw water.

TREATED WATER QUALITY
Potable water according to WHO Drinking Water Quality Standards

SPECIAL MODELS
WaterCap treatment plants can be engineered upon request to cope with the variations of inlet water quality on inspection of the water analysis. Our containerised models can be from a single unit through to multiple units to support the required drinking water output clients require, we are also set up to provide bespoke and fixed infrastructure water treatment plant builds.

TEMPERATURE
The Design temperature is 5 - 35°C (Nominal Temperature 20°C)
- Detailed P&ID layout diagrams along with complete hydraulic and electrical drawings will be delivered within four weeks following order confirmation date.
1. Construction of a solid reinforced concrete flat base with no inclination in order the container can be placed horizontally.

2. Installed rated power up to 72kW (400V / 50 Hz)

3. Drain Channels for discharge to drain reject water dependent on size of treatment plant.

4. Appropriately dimensioned pipes from the untreated water tank to the container inlet and outlet towards the treated water tank.

5. Static IP address which will forward remote Internet users to PLC IP. Infrastructure such as router, UTP cable for distance monitoring with a connection baud rate 2 Mbps.

6. Detailed chemical analysis prior to start up.
COG is an official distributor of the patented OSMOSUN® solar (without the use or need for batteries) and mains-powered desalinated water purification system. We have sole distribution rights across Africa and in the following countries and states:

- Somalia
- Somaliland
- Puntland
- Yemen
- Uganda
- North Mozambique

COG's solar-partner is one of four companies worldwide who are capable of producing battery-free solar-powered water purification technology.

CAMP OPERATING GROUP (COG)

A division of Enigma Alliance and a Chelsea Group company, COG built and manages Chelsea Village – the comfortable and secure life support accommodation compound in Mogadishu, Somalia, host to 150 guests.

COG also built and installed the original 120,000L/day WaterCap desalination plant at Chelsea Village in 2013. The purification plant supplies purified potable water to World Health Organization (WHO) and European Union standards to all guests and staff. Our water standards allow Chelsea Village to operate a plastic-bottle-free water supply to 150+ residents, daily.

Our official distribution partner has installed numerous solar-powered purification plants around the world. This ground-breaking, patented solar energy management technology coupled with COG’s ability to operate throughout Africa in the highest of threat levels, allows for the confident provision of either solar or mains powered water purification solutions in any rural or conflict-affected zone.
Benefits Of Solar-powered Water Purification Technology

**100% Solar energy**
- No need for batteries.
- Without fossil fuel and no CO2 emission
- No monthly operating costs

**Strong economic competitiveness**
Return on investment from 1.5 to 3 years - One of the lowest purified water costs

**Low energy consumption**
2.5 kWh/m³: lowest level of advanced desalination technologies

**No greenhouse gas emission in operation**
Low brine rejection

**DIFFERENT MODES AVAILABLE:**

- **5,000L per day Solar Powered OR 18,000L per day in Hybrid (solar & mains) mode**

**SOLAR MODE (100% SOLAR)**
This power-supply mode will incur no monthly electricity or diesel/generator operating costs, allowing for substantial OPEX savings. This operating mode alone will cover the client’s current water usage requirement during a full day of sunlight and will also enable the client to operate 100% environmentally friendly system which will ultimately pay for itself over three years.

**ENERGY MANAGEMENT SYSTEM IN BRIEF:**
A measure of the available solar power allows the unit to start up, functioning under variable speed and flow and depending on the sun’s intensity. The patented storage accumulator’s system compensates the energy fluctuation due to cloud cover or lack of sun. In this mode, the pyranometer stops the process at dawn, which switches on stand-by mode, till the following day’s sunlight.
HYBRID MODE (SOLAR COMBINED WITH THE ELECTRICAL GRID) PRODUCING MAX CAPACITY

This power-supply method will incur approx. 20% of the first option’s monthly operating costs.

Energy management system in brief:
The unit functions by coupling solar energy and the conventional electrical grid.
The solar power is used in priority and entirely consumed, the network energy is complementary during the day and becomes the only energy source at night if need.

PLANT TYPES

WaterCap is able to design and supply according to specific needs and has a range of 14 standard water plants catering from 1,000L/day up to 600,000L/day, 100% solar-powered purification systems.

Our largest plant has the capacity to purify 2,000,000L/day when coupled in Hybrid mode.

Our smallest 1,000L per day plant arrives in a 1m X 1m shipping box, which includes solar panels to suit. This is the ideal plug and play solution for low volume needs in any environment with limited or no access to the electrical grid.

Our larger plants are custom-built into either 20ft or 40ft ISO containers, and are shipped.

PLANT TYPE OPTIONS

Various plant size options available (sea water & brackish water purification):

<table>
<thead>
<tr>
<th>PLANT OPTIONS</th>
<th>SEA WATER PURIFICATION</th>
<th>BRACKISH WATER PURIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Capacity (m³/h)</td>
<td>100% Solar Capacity (m³/day)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0,1</td>
<td>0,70</td>
<td>2,5</td>
</tr>
<tr>
<td>1,3</td>
<td>10</td>
<td>35</td>
</tr>
<tr>
<td>2,6</td>
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<td>30</td>
<td>200</td>
<td>650</td>
</tr>
<tr>
<td>43</td>
<td>300</td>
<td>950</td>
</tr>
<tr>
<td>86</td>
<td>600</td>
<td>2000</td>
</tr>
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</table>
To deliver high quality permeate water coupled with outstanding fouling resistance, membranes are selected from the best suppliers (DOW, Toray) for their high performance, robustness, and durability. The efficiency and sustainability of the membranes under the OSMOSUN® process were certified by the European Institute of Membranes.

The units are equipped with an energy recovery device to obtain the lowest specific energy consumption for RO (Reverse Osmosis) plants. All the pumps and energy recovery devices are manufactured by the highly accredited Danfoss. Volumetric pumps made with high-quality stainless steel 904L. Efficiency of such pumps reaches 94%. Centrifugal multistage pumps made with high quality in stainless steel 316L.

All the high-pressure piping is made of stainless steel AISI 904L Super Duplex, connected with welding and Victaulic fittings. The low-pressure piping is made of HDPE and PVC with Plasson and PP fittings. The valves are supplied by well-know international brand companies.

The electrical cabinet is provided with the HMI and the Programmable Logic Controller. The units can be equipped with a remote monitoring system. This system allows the archiving of data and SMS monitoring.

Low OPEX, among 0,25€ to 0,30€/m³ for such range of RO unit. The solar free energy decreases the usual OPEX more than 50% compared to conventional RO plants powered by the grid or batteries.

Past and Proven Performance

1. MAINS-POWERED WATER TREATMENT PLANT IN MOGADISHU

This is the 100% mains-powered water purification plant currently supplying WHO-standard purified water to 150 Chelsea Village residents daily inside the AAIA zone in Mogadishu.

- Nature of the project: Turnkey desalination water supply project supplying Chelsea Village accommodation camp with WHO-standard potable water, piped throughout the camp.
- Cumulated capacity: 120 m³ per day
- Energy supply: Utilization of main electrical power grid only.
- Commissioning: Sept 2013

COG’s water purification system in Somalia has been providing WHO-standard potable water to the international community currently stationed at Chelsea Village in Mogadishu, Somalia since 2013.

Our currently installed water desalination plant at Chelsea Village in Mogadishu, which has the capacity to produce 120,000 litres per day.
WaterCap’s 20ft or 40ft containerised water purification solutions

The WaterCap Desalination Plant at Chelsea Village is linked via internet allowing for alarm parameters to be monitored live 24/7.
This is 1 of 6, 100% SOLAR-powered water purification plants currently supplying WHO-standard purified water to 6 villages in the Gaza province of Mozambique as shown below:

While boreholes enabled easy access to underground water resources, the salinity levels of these made the water unsanitary for human consumption, forcing local inhabitants to walk a long way — 7 to 10km — every day to directly access fresh water, from the nearby river. To address this unbearable situation, a support agency launched a standalone solar desalination programme to supply purified water to a set of six villages, representing more than 7,200 inhabitants of this remote region; four villages being totally off the power grid, located 200km inland.

- **Nature of the project:** Turnkey water supply projects connecting solar powered desalination units with no battery to a small-scale water distribution system.
- **Cumulated capacity:** 145 m3 per day split over 6 sites
- **Energy supply:** total solar power installed of 88kWp. 4 units works 100% solar powered with no battery, and 2 units are Hybrid connecting to the grid for functioning without sunlight.
- **Commissioning:** June 2018

A NEW SOLUTION FOR THE FRESH WATER SUPPLY OF AFRICA

The installation of the six units demonstrates the technical and economic viability of solar powered desalination to supply clean drinking water to remote populations of Africa. This reference opens a new future to communities throughout Africa which, still do not benefit from this vital resource, and is an opportunity which COG is proudly part of.
WaterCap Offering

1. Design, deliver, supply of Equipment as previously described.
2. Procurement of equipment as previously described.
5. KKS numbered P&ID’s and labelled Electrical Drawings and system parts for convenient installation and access.
6. Feasibility for FAT testing of the system prior to shipment
7. Feasibility for training at the factory.

Warranty / Payment Terms

**WARRANTY**
Twelve months according to the company warranty policy. Consumables such as cartridges and chemicals are not included. The warranty does not cover Indirect costs and loss of earnings and is valid only on condition that spare parts and consumables proposed are used. During the time of warranty any defective or worn piece of equipment or spare part will be replaced at no extra cost. Failures associated with abnormal use of the equipment, violation of written operating Instructions and external factors are excluded from warranty.

**PAYMENT TERMS**
Prices: In Dollars Net excluding VAT. Costs are dependant on water analysis and client specific requirements and will be supplied on quotation.
Payment Terms: 50% Advance Payment, 50% at FAT test completion
Delivery time: 80 - 110 days
Delivery Terms: Ex Works Factory.

**BUYING OPTIONS**
- Straight buy
- Leasing
- Water purchasing mechanisms
- End-to-end solution

**SERVICE SUPPORT**
Enigma Alliance has a dedicated construction team that can conduct site surveys and pre construction work on all Civil’s required to support your containerised water treatment plant; this is at an additional cost. Our team have worked in some of the most hostile places in the world and are set up to work in harsh conditions.

We also have a trained service department and personnel for reliable efficient After Sales Service. Our team will ensure that logistical supply lines are established for Chemicals and spare parts that are required to support your water operation. This is at an additional cost.

WaterCap and Enigma Alliance services are set up to provide the client with an end-to-end solution and service, when required by client.
For more information on how we can support your solar-powered or mains-powered water purification needs, please reach out to:

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